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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,171	11/25/2003	Arthur Gritzky	134368	7013

7590 03/06/2007  
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EXAMINER
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AZARIAN, SEYED H

ART UNIT	PAPER NUMBER
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2624

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/06/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/722,171	<b>Applicant(s)</b> GRITZKY ET AL.	
	<b>Examiner</b> Seyed Azarian	<b>Art Unit</b> 2624	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 November 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3 and 5-20, are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheehan et al (U.S. patent 6,106,466) in view of Wiesauer et al (U.S. patent 6,482,159).

Regarding claim 1, Sheehan discloses an apparatus for detecting a contour of an object within an image, comprising (see abstract, delineation of heart contours from image using reconstruction-based modeling);

a user interface for selecting first and second points within an object, said object being within an image (column 6, lines 26-48, a user may elect to manually edit the mesh model, also column 9, lines 38-59);

and a processor for detecting first and second sub contours based on said first and second points, respectively, said first and second sub contours being based on detected edges (column 8, lines 3-13, producing three-dimensional using processing unit, further lines 22-32, ultrasound imaging using processor, also column 10, lines 16-56, refer to the different points and interface).

However regarding claim 1, Sheehan discloses (Fig. 1, column 14, line 54 through column 15, line 24, automatic border detection is performed by optimizing a fit of images predicted from the mesh model, to the patient's images. Fig. 13, starting with a block in which the mesh model

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rigidly aligned and scaled to match the image data at three landmark points input for each patient image), but does not explicitly state its corresponding “processor combining said first and second sub contours into a contour. On the other hand Wiesauer in the same field of examination of object with ultrasound teaches (column 2, lines images display simultaneously a variety of images as a 3D image combined with a histogram of the flow distribution on the surface (contours) of the object whereby the surface is superimposed to the 3Dimage so that complex spatial relationship can be visualized).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Sheehan invention according to the teaching of Wiesauer because combination of Sheehan and Wiesauer it allows to produce images which cannot be achieved by standard ultrasound scanning due to anatomical reason, which can easily be implemented in medical system such as ultrasound device.

Regarding claim 2, Sheehan discloses the method of claim 1, said user interface further comprising at least one of a mouse having at least one selectable button, a keyboard, a track ball, a touch screen, and a touch pad (Fig. 2, column 8, lines 7-12, keyboard 58).

Regarding claim 3, Sheehan discloses the method of claim 1, said processor further comprising a preset limit, said pre-set limit defining image subsets with respect to said first and second points, said processor searching said image subsets for said detected edges (column 9, lines 1135, the images are recorded at a plurality of time points in a cardiac cycle, also column 13, line 66 through column 14, line 15).

Regarding claim 5, Sheehan discloses the method of claim 1, said image being based on one of diagnostic ultrasonic, X-ray, CT, and MR data (column 11, lines 4-7, ultrasonic imaging system).

Regarding claim 6, Sheehan discloses the method of claim 1, further comprising a display for displaying at least one of said first sub contour, said second sub contour, and said contour (column 8, lines 3-9, graphics display).

Regarding claim 7, Sheehan discloses the method of claim 1, said user interface further comprising an input for deselecting a point within said contour, said processor defining an updated contour excluding said point (column 16, line 65 through column 17, line 12, the feature comparison of features between predicted and observed images, and area assessment are repeated).

Regarding claim 8, Sheehan discloses the method of claim 1, further comprising a display for displaying said first sub contour after said processor detects said first sub contour, said display erasing said first sub contour and displaying said contour after said processor combines said first and second sub contours (Fig. 7, column 11, lines 45-63, images are rearview on graphic display and frames are selected for specific anatomic at certain time. To determine which images were scanned at particular time during the cardiac cycle, and ECG can be recorded for identification of the time points (past) is assisted also by review of the images).

Regarding claim 9, Sheehan discloses a user interactive method for detecting the contour of an object within an image, comprising: selecting a first point within an object using a user interface, said object being displayed within an image; identifying a first sub contour based on said first point; selecting a second point within said object using said user interface; identifying a

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second sub contour based on said second point; and defining a contour based on said first and second sub contours (see claim 1, also column 13, lines 25-48, user manually selects a representative subset of the image planes for tracing).

Regarding claim 14, Sheehan discloses the method of claim 9, further comprising: selecting a third point using said user interface; defining a third sub contour based on said third point; and calculating an updated contour based on said contour and said third sub contour (column 13, lines 25-47, refer to calculating a candidate border in each plane).

Regarding claim 16, Sheehan discloses the method of claim 9, further comprising: selecting N points within said object using said user interface; identifying N sub contours based on said N points, said contour further comprising being defined based on N sub contours, said contour comprising a closed loop or circle around an interior portion; and updating said contour to include said interior portion (column 13, line 66 through column 26).

Regarding claim 17, Sheehan discloses a method for calculating and/or measuring parameters of an object within an image, comprising: acquiring an image comprising an object, said image further comprising pixel or Voxel data; selecting points within said object using a user interface; searching for edges within said image around said points as said points are selected, said edges being representative of non-uniformities in said pixel or Voxel data, said edges defining sub contours around each of said points; combining said sub contours into a contour as each of said sub contours is defined; and calculating a parameter (see claim 1, also column 7, lines 12-27, determining cardiac parameter, further refer to axis and lines 57-62).

Regarding claim 19, Sheehan discloses the method of claim 17, said image further comprising one of 2D and 3D tissue data. (Fig. 13, column 7, lines 52-55, generate a three-dimensional image).

Regarding claim 20, Sheehan discloses the method of claim 17, further comprising: said acquiring step further comprising acquiring a 3D volume of data; said searching step further comprising searching for said edges around said points within said 3D volume, said sub contours forming irregularly shaped volumes based on said points; and said combining step further comprising combining said irregularly shaped volumes into said contour, said contour comprising a single irregularly shaped volume (see claim 1, also column 14, line 53 through column 15, line 10, three-dimensional shape).

With regard to claim 10, 11 and 12, the arguments analogous to those presented above for claims 1, 3 and 5 are respectively applicable to claims 10, 11 and 12.

With regard to claim 15, 13 and 18, the arguments analogous to those presented above for claims 1, 8 and 19 are respectively applicable to claims 15, 13 and 18.

3. Claim 4, is rejected under 35 U.S.C. 103(a) as being unpatentable over Sheehan et al (U.S. patent 6,106,466) in view of Wiesauer et al (U.S. patent 6,482,159) as applied to claims above and further in view of Yamauchi (U.S. 7,110,583).

However regarding claim 4, neither Sheehan nor Wiesauer explicitly state, "creating contour in real-time". On the other hand Yamauchi, teaches (column 8, lines 18-29, ultrasonic diagnostic generating 3D image in real-time).

Therefore it would have been obvious to a person of ordinary skill in the art at time the invention was made, to modify Sheehan and Wiesauer invention according to the teachings of

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Yamauchi because it provides ultrasound images in real-time that can be accumulated to be precisely analyzed later in a close examination for better accuracy.

### Other prior art cited

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(U.S. patent 5,148,494) to Keskes is cited for process for automatic plotting and assistance interpretation of seismic cross-section in particular using image analysis techniques.

(U.S. patent 5,170,440 to Cox is cited for perceptual grouping multiple hypothesis probabilistic data association.

(U.S. patent 5,566,246) to Rao is cited for system and method for ranking and extracting salient contours for target recognition.

(U.S. patent 6,346,124) to Geiser et al is cited for autonomous boundary detection system for echo cardio graphic images.

### **Contact Information**

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed Azarian whose telephone number is (571) 272-7443. The examiner can normally be reached on Monday through Thursday from 6:00 a.m. to 7:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella, can be reached at (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR.

Status information about the PAIR system, see [http:// pair-direct.uspto.gov](http://pair-direct.uspto.gov). Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Seyed Azarian*  
*Patent Examiner*  
*Group Art Unit 2624*  
March 4, 2007

A handwritten signature in cursive script that reads "Seyed Azarian".